

Generic Validation Issues List

Applicable to International Validation and Domestic Certification Projects

Updated: May 31, 2006

Airframe

Subject	Description
Center Landing Gear	Proposed Special Conditions (in addition to and in lieu of several landing regulations) for airplanes configured with center landing gear.
Damage Tolerance	A means of compliance to § 25.571. Damage tolerance of engine mounts is not "impractical", and is therefore normally required.
Depressurization into unpressurized areas	Known unsafe condition: depressurization into unpressurized areas. Covered by Amendment 25-72 to § 25.365.
Automatic speed protection for design dive speed	Proposed Special Conditions (in lieu of § 25.335(b)). Allows for consideration of automatic speed protection systems to reduce design dive speed.
Pressurization doors not fully closed and locked	A means of compliance to § 25.783(f). Means to prevent initiation of pressurization for doors not fully closed and locked. FAA considers that failure of this means must be extremely improbable.
Finite element model validation	A means of compliance to § 25.307(Proof of structure). Expands upon finite element model validation.
Fire protection of flight structure	A means of compliance to § 25.865 (Fire protection of flight controls, engine mounts, and other flight structure). Outlines specific criteria derived from various advisory material.
Interaction of systems/structures	Proposed Special Conditions. Requirements for evaluating the interaction of systems and structures for aircraft with automatic flight control systems.
Pilot forces for side stick controls	Proposed Special Conditions (in lieu of § 25.397(c)) (Limit pilot forces and torques). Pilot forces for side stick controls.
Fuel tanks installed in the horizontal stabilizer	Proposed Special Conditions (in addition to § 25.963(d)). Requirement for fuel tanks installed in the horizontal stabilizer.
Flutter following loss of winglet	A means of compliance to § 25.629 (Aeroelastic stability requirements) that outlines requirement for freedom from flutter following the loss of at least one winglet.
Engine torque loads for sudden engine stoppage	Proposed Special Conditions due to the size, configuration, and failure modes of jet engines changing considerably from those envisioned by § 25.361(b) when the engine seizure requirement was first adopted.
Design Roll Maneuver Requirement for Electronic Flight Controls	The special condition adds a roll check maneuver and defines the design condition in terms of cockpit control displacement instead of aileron deflection. Also applicable to airplanes that use roll spoilers or other non-linear control systems.

Avionics

Subject	Description
Enhanced vision systems	Infrared or other sensor-based vision systems provided on head-up displays require special conditions because they are intended to partially substitute for natural vision assumed by 25.773.
Synthetic vision systems	Use of terrain data from a database to display “synthetic vision” information to the pilot

Interiors, Cabin Safety

Subject	Description
Side-facing seats (multiple occupant divans)	The only certification method available for this type of seating, for aircraft that include Amendment 25-64 in their certification basis, is through an exemption from the general injury requirements of § 25.785(b).
Side-facing seats (single occupant)	Proposed Special Conditions that provide testing and human injury for single-occupancy, side-facing seat certifications for aircraft that include Amendment 25-64 in their certification basis.
Certification of Cooktops	Proposed Special Conditions for cooktops. Cooktops introduce high heat, smoke, and the possibility of fire into the passenger cabin environment. These potential hazards to the airplane and its occupants must be satisfactorily addressed.
Child shoulder harnesses for seats	Special conditions are required
Ditching dam	Installation of a portable “dam” used to cause the water level against a ditched airplane to be higher before water could spill through at exit. An equivalent safety finding may be required (Ref. 25.807(i))
Emergency Exit Marker & Locator Signs	For small cabins, ESFs have been granted to allow smaller exit signs than required by 25.812(b).
Glass in the cabin (partitions, gas plasma monitors, large LCD monitors in seat backs, etc.)	Depending on the extent of use, special conditions or a method of compliance issue paper may be required.
Inflatable Restraints in Seats/Walls	Currently available airbag materials do not meet flammability requirements. Special conditions are required.
Interior cabin doors	If passenger compartments are separated by interior doors, an exemption is required if airplane has 25.813(e) at Amendment 25-1 or later in its cert basis. Exemptions have only been granted for airplanes that are privately operated only.
Medical stretchers	An exemption is required on airplanes with 25.562 and 25.785 at Amendment 25-64 in their cert basis.
Overhead or under floor crew rest areas	Special conditions are likely to be required
Stowage/Baggage compartment fire protection in remote areas	Special conditions are required for certain remote areas that contain combustibles and ignition sources.

Class E cargo compartments	If supernumeraries (including animal handlers) are to be carried, an exemption is required.
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Flight Controls

Subject	Description
Control System Gust Locks – Limit Operation of Aircraft	If a physical block of some kind (e.g. throttle interlock) is not used to limit operation of the airplane, an ESF may be required
Electronic Flight Control Systems (EFCS)	Certification issues related to airplanes with EFCS, unconventional flight control laws (fly-by-wire, C*, etc.) and side stick controllers. Special conditions will be required.
Flight Control System Failure Criteria	Equivalent level of safety with § 25.671(c)(2) based on the proposal from the Flight Controls Harmonization Working Group (FCHWG) Aviation Rulemaking Advisory Committee (ARAC) and the draft harmonized AC/AMJ 25.1309 ("ARSENAL" version) from the System Design and Analysis Harmonization Working Group (SDAHWG)

Flight Test

Subject	Description
Ice contaminated tailplane stall	Provides certification guidance for compliance with FAR 25.143 with an ice contaminated tailplane. Airplane must show no susceptibility to ice contaminated tailplane stall (ICTS) as defined by a zero-g pushover and full rudder sideslip maneuvers.
Return landing capability (Fuel jettison)	Describes criteria to be evaluated to determine if a fuel jettison system is required for an immediate return landing. Tire speed limits and maximum brake energy are of concern.
Flight control surface position awareness	Proposes a Special Condition for airplanes equipped with Electronic Flight Control Systems to require some means of conveying control surface position awareness to the flight crew to preclude inadvertently reaching a control surface limit.
Hydrophobic Windshield Coating in Lieu of Wipers	25.773(b)(1) only requires testing at high speeds & precipitation rates, but coatings are least effective at low speeds & precipitation rates. Special conditions are needed if there are no wipers.
ATTCS	Proposed Special Condition for performance credit for ATTCS during Go-Around. (In addition, an equivalent level of safety in lieu of providing the required means for the flight crew to deactivate the automatic function of the ATTCS system may be needed.)

Propulsion

Subject	Description
Backing using reverse thrust (powerback)	Defines considerations for certification of thrust reversers for power backing.
Beta lock out for turboprops	Documents a known unsafe condition. Section 25.1155 requires that for propeller reversing systems intended for ground use, that a positive means to prevent inadvertent reverse or beta operation be provided. Unsatisfactory service experience that resulted in several accidents on part 25 turbopropeller

	airplanes has shown that this requirement does not provide protection from intentional operation in the beta mode.
Engine icing protection	Provides a means of compliance with §25.1093(b)(1) for protection of the engine during icing conditions with engine power at in flight idle conditions and regulatory need for consideration of the airframe as part of the engine inlet.
Engine ingestion of airframe shed ice	Defines need to address potential ingestion of wing ice that may form during non-icing conditions that sheds and caused all engine failure. It is applicable to all aft fuselage mounted engine installations.
APU inlet fire protection	Defines issues for APU inlet fireproofness requirements.
Flammable fluid drainage	Provides a method of compliance for flammable fluid drainage analysis and testing.
Engine fire protection	Defines methods of compliance with requirements of §25.1193 for fireproof engine and APU enclosures.
Engine fire protection	Documents a known unsafe condition and defines requirement that all FIREX connection be designed to preclude cross connection. Defined as unsafe feature on some aircraft.
Engine fire detectors	Defines proposed criteria for achieving an equivalent safety finding for fire detectors in engine tailpipe, § 25.1203 (a).
Engine fire zone hydraulic system shutoff valve	A method of compliance for hydraulic system shutoff valve.
Engine strut fire protection- hydraulic components	Provides a proposed method for showing equivalency to the requirements for fire resistant flammable fluid carrying lines (hydraulic systems components) in engine pod attaching structure.
Toxic gas from composite APU tailcone	Defines considerations for toxic gas produced by composite structures. Applicable to airplanes with composite ducting or structures in fire zones.
Auxiliary fuel tank installations	Applicable to auxiliary fuel tank located aft and adjacent to the passenger compartment and cargo compartment.
Fuel tank in horizontal stabilizer	Defines considerations for location of fuel tankage within the horizontal stabilizer.
Fuel system/cockpit interface safety analysis	Defines considerations for safety analysis of the fuel system in relation to cockpit interface issues.
Flame arrestors in fuel tank vent lines	Notifies applicant of proposed requirement for flame arrestors in fuel tank vent lines.
Thrust reverser controllability	Defines considerations for finding of compliance to the controllability requirements of §25.933.
Reverser controls without interlock	Defines considerations for finding of no unsafe condition due to lack of tactile feedback that reverser is not deployed via the cockpit reverser controls.
Thrust reverser controllability	Provides a proposed Equivalent Safety Finding to the controllability requirement of § 25.933.
APU rotor containment	Defines considerations for APU to be compliant to §25.903 for APU's meeting the rotor containment provisions of TSO C77a (blade containment only).

APU rotor integrity	Defines considerations for APU to be compliant to §25.903 for APU's meeting the rotor integrity provisions of TSO C77a.
All-Engine restart	Documents a potential unsafe condition for engine restart following loss of all engine power. Applies to all airplanes powered by high bypass engines, engines with free power turbines, or with limited restart capability.
APU Indications	Defines considerations for equivalent safety to indications required for APU's by §25.1305.
AVM (airborne vibration monitoring) indication	Documents need to provide AVM indication.
AVM (airborne vibration monitoring) qualifications	Provides a method of compliance to the qualification requirements for AVM indicators.
Fuel filter bypass indication	Provides a method of compliance with § 25.1305(c)(6) to provide indication of impending fuel filter bypass and associated flight manual procedures.
Digital display of engine rotor speed N2	Defines considerations for display of digital only N2 rotor speed.
Warning means for engine oil filter contamination	Provides a proposed equivalent level of safety to the requirements for indication of impending oil filter bypass.
Engine shared electronic displays	Defines considerations for shared electronic displays.
Fuel temperature indication	Provides a acceptable method of compliance with § 25.1521(c)(2).
Fuel shutoff valves	Proposed equivalent level of safety to requirements for fuel shutoff.
Uncontrollable High Thrust (UHT)	Engine controls may have single catastrophic failures (ref 25.901(c))
Fuel Tank Inerting	Flammability reduction systems require special conditions.
APU certification requirements	Proposed equivalent level of safety to adopt the draft FAR 25 new Appendix K requirements rather than comply with the current FAR 25 applicable airworthiness requirements for APU.
ATTCS	Proposed equivalent level of safety in lieu of providing the required means for the flight crew to deactivate the automatic function of the ATTCS system.

Noise

Subject	Description
Noise requirements	Applied to all foreign certification projects. Addresses requirements for compliance with noise requirements of Part 36.
Noise Control Act of 1972	Applied to all new T.C. projects. Defines requirements for compliance with Noise Control Act of 1972 and FAA Order 1050.1D, which are in addition to noise requirements of Part 36.

Electrical Systems

Subject	Description
High Intensity Radiated Fields (HIRF) Protection	Proposed Special Condition - Affected airplanes include those with modern electronics in safety critical applications such as displays, engine controls, flight controls, etc.
Operation without normal electrical power	Proposed Special Condition - Affected airplanes include those with modern electronics in safety critical applications such as displays, engine controls, flight controls, etc.
General Software Guidance	USA national policy that applies to all cross FAR part TC/STC and Validation Programs, including TSO equipment (21, 23, 25, 27, ...33). References AC 20-115B, FAA Order 8110.49, and Software Review Job Aid.
Assurance of Simple and Complex Electronic Hardware	References USA national policy that applies to all cross FAR part TC/STC and Validation Programs, including TSO equipment (21, 23, 25, 27, ...33). References AC 20-152 and DO-254. [Note: replaces PLD IP.]
Commercial off-the-shelf (COTS) software	Applies to all aircraft using COTS software components.
Flight Data Recorders (FDR) - Filtering data	Investigations of airplane accidents and incidents have resulted in heightened awareness of the importance of the flight data recorder (FDR) accurately recording the actual sensed value of a parameter.
Lithium batteries	Lithium batteries have potential failure modes, such as loss of capacity and thermal runaway, which require special conditions.

Mechanical Systems

Subject	Description
Cabin Outflow Valve	Proposed Equivalent Safety Finding for cabin outflow valve and safety valve functions combined in a single valve. Ref: § 25.841
Cabin Pressurization - High Altitude Airports	Proposed Equivalent Safety Finding: Cabin Pressurization-High Altitude Takeoff and Landing Operations.
Icing Protection § 25.1419 and 25.1309	Means of compliance for an Electro-Impulse deice system. Ref: §§ 25.571, 25.1353, 25.1419, 25.1581, 25.1585
Icing Protection § 25.1419 and 25.1309	The current regulation, part 25, Appendix C is not adequate to address freezing drizzle and freezing rain conditions e.g., supercooled large droplets or SLD.
Protective Breathing & Oxygen Systems	Requires incorporation of features to ensure that an inoperative crew oxygen system is annunciated to the flight crew. Two incidents of false indication of sufficient oxygen supply have recently occurred.
Liquid Oxygen Systems	Proposed Special Condition for design and installation criteria for a Liquid Oxygen System. Ref: §§ 25.831, 25.1309, 25.1441, 25.1451, 25.1453.
Potable and Waste Water Systems	System design to minimize the possibility of leaks and resulting formation of ice that can pose a hazard to the airplane, its occupants, and/or persons and property on the ground.
High Altitude Decompression	Compliance with cabin altitude limits (ref §25.841(a)(2) & (3)) affected by decompression requirements of Amendment 25-87. An exemption is needed for any airplane that will exceed the limits of §25.841.